

## Statement of Legal and Factual Basis

### 1. Introduction

#### 1. Facility Information

##### **Permittee/Facility**

VCU Steam Plant MCV Campus  
1020 Oliver Hill Way  
P.O. Box 980166  
Richmond, VA 23298

##### **Responsible Official/Facility Contact**

David A. Mitchell  
General Manager  
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Registration No.: 50126

County-Plant ID No.: 760-0013

#### 2. Source Description

The facility is a fossil fuel-fired steam generating plant (SIC 4961) which is operated by Virginia Commonwealth University (VCU) in order to provide steam to various VCU buildings and facilities, including certain Medical College of Virginia (MCV), a division of VCU, buildings. The current equipment, three 150 MMBtu/hr boilers, began construction in May 1994 and began operation on April 30, 1996. These boilers were permitted originally in a NSR permit dated February 22, 1993. The permit has since been amended thrice, April 29, 1993 and December 16, 1996, to clarify stacktesting requirements and March 7, 2001 to properly designate state-only enforceable conditions.

#### 3. Compliance History

The three current boilers replaced several old coal and residual oil-fired boilers that had been previously permitted in February 1, 1979 and September 24, 1984. These two permits were superseded by the issuance of the original 1993 permit for the three new boilers. After receiving their 1993 permit and its subsequent amendments, the new steam plant, as noted above, began operation on April 30, 1996. The permit provided VCU with 180 days to conduct performance tests on the new boilers. Due to problems with CEM equipment, VCU was only able to partially fulfill their testing requirements within the 180 day period. In anticipation of this, VCU and DEQ entered into a consent order (CO) on October 31, 1996. This CO contained a performance testing schedule giving VCU until the end of January 1997 to complete all required testing. On April 4, 1997, DEQ determined that all provisions of the 10/96 CO had been satisfied and terminated the CO.

Since the start-up of the new steam plant in 4/96, there have been 4 inspections, two in 2001 and two in 1997, and the facility was found to be in compliance each time.

## 2. Emissions Units

### a. Significant emission units:

- three Babcock and Wilcox (B&W) natural gas/residual oil-fired boilers with maximum rated heat input capacities of 150.6 MMBtu/hr each (Reference No. BOE-001, BOE-002, BOE-003).
- two No. 6 fuel oil storage tanks rated at 243,000 gallons each (TKE-001, TKE-002)

### b. Control equipment:

- B&W flue gas recirculation (@15%) on each boiler as part of the B&W low-NOx combustion system.

## 3. Emissions Inventory

An emission update was received for the year 1999. The actual annual emissions from the facility were 2.3 tons of PM, 2.0 tons of PM-10, 10.7 tons of SO<sub>2</sub>, 26.1 tons of NO<sub>x</sub>, 24.7 tons of CO, and 3.5 tons of VOC.

## 4. Applicable Requirements

### a. Emission Unit Applicable Requirements

1. Each of the three B&W boilers has the following applicable requirements, from the **specific** conditions of the 2001 permit:

Condition #4: NO<sub>x</sub> emissions controlled by low-NO<sub>x</sub> burners and good combustion practices.  
(9 VAC 5-80-10 H and 9 VAC 5-50-260)

Condition #7: CO and VOC emissions controlled by good combustion practices.  
(9 VAC 5-80-10 H and 9 VAC 5-50-260)

Condition #8: The approved fuels are #6 oil and natural gas. #2 oil to be only used for start-up and shutdown.  
(9 VAC 5-170-160)

Condition #10: Maximum combined annual natural gas consumption of 1,706 million cubic feet, calculated as the sum of each consecutive 12 month period.

The three boilers shall consume no more than 0.30 million cubic feet of natural gas per hour.  
(9 VAC 5-170-160)

Condition #11: Maximum combined annual #6 oil consumption of 1,830,000 gallons, calculated as the sum of each consecutive 12 month period.

The three boilers shall consume no more than 2000 gallons of #6 oil per hour.  
 (9 VAC 5-170-160)

Condition #12: Emissions from the operation of each of the three new boilers shall not exceed the limits specified below:

Natural Gas

TSP		0.8 lbs/hr
PM-10		0.8 lbs/hr
Sulfur Dioxide		0.09 lbs/hr*
Nitrogen Oxides	0.1 lbs/10 <sup>6</sup> Btu**	14.9 lbs/hr
Carbon Monoxide		14.4 lbs/hr
VOC		2.0 lbs/hr

#6 Fuel Oil

TSP		7.8 lbs/hr
PM-10		5.5 lbs/hr
Sulfur Dioxide		78.5 lbs/hr*
Nitrogen Oxides	0.4 lbs/10 <sup>6</sup> Btu**	57.5 lbs/hr
Carbon Monoxide		15.0 lbs/hr
VOC		2.0 lbs/hr

\* (3-hour rolling average)

\*\* (30-day rolling average)

(9 VAC 5-50-260 and 9 VAC 5-50-180 of State Regulations)

Condition #13: Plant wide emissions from the operation of the three new boilers shall not exceed the limits specified below:

TSP	15.6 lbs/hr	11.4 tpy
PM-10	11.0 lbs/hr	9.3 tpy
Sulfur Dioxide	157.0 lbs/hr	72.3 tpy
Nitrogen Oxides	115.0 lbs/hr	137.1 tpy
Carbon Monoxide	30.0 lbs/hr	95.6 tpy
VOC	4.0 lbs/hr	12.9 tpy

(9 VAC 5-50-260 and 9 VAC 5-50-180 of State Regulations)

As a result of EPA comment, the above condition, condition #13 from the 2001 minor nsr permit, will be appear in a slightly revised fashion in the Title V permit. The phrase "calculated monthly as the sum of each twelve month period" will be added to the annual emission limit portion of the condition in the Title V permit. The fuel throughput recordkeeping condition that provides enforceability to these annual emission limits is already in this type of rolling 12-month average format, so the revised condition will not represent an actual new requirement, it will simply make the emission and throughput conditions consistent.

Condition #14: Visible Emissions from the three boilers not to exceed 10 percent opacity as measured by Method 9  
 (9 VAC 5-50-20 and 9 VAC 5-170-160)

- Condition #16: Continuous emission monitors for opacity, NO<sub>x</sub>, and CO<sub>2</sub> or O<sub>2</sub> shall be installed and located on each boiler stack. The monitors shall be maintained and calibrated as specified in 40 CFR 60.13. (9 VAC 5-50-40)
- Condition #18: NO<sub>x</sub> and opacity CEM data shall be recorded and kept on file. (9 VAC 5-50-40 and NSPS 60.49b(f))
- Condition #19: Submit quarterly reports of CEM data. (9 VAC 5-50-40 and 9 VAC 5-170-160)
- Condition #20 NO<sub>x</sub> and opacity CEMS shall meet minimum 90% data availability on a 12 month rolling average. NO<sub>x</sub> monitors shall meet the requirements of 40 CFR 60 Appendix F. (9 VAC 5-170-160)
- Condition #21: Sulfur content of oil not to exceed 0.5% by weight per shipment. (9 VAC 5-170-160)
- Condition #25: Maintain records for most recent 5 years including;
- yearly throughput of natural gas to each boiler
  - hours of operation of each boiler
  - yearly throughput of #6 oil to each boiler
  - yearly throughput of distillate oil to each boiler
  - oil shipments purchased including sulfur content
  - maintenance schedules and records for each boiler and CEM
  - operator training records
  - storage tank dimension records
- (9 VAC 5-50-50)

In addition, each of the three boilers is subject to NSPS Subpart Db. Some of the provisions of this NSPS were incorporated into the 2001 permit (in the form of the conditions listed above). These include 60.42b - standard for sulfur dioxide (condition #21), 60.43b - standard for particulate matter (subsumed by more stringent state BACT of condition #14), 60.44b - standard for nitrogen oxides (lb/MMBtu limits of condition #12), and 60.48b - emission monitoring for particulate matter and nitrogen oxides (conditions #16-20). Some requirements of the NSPS were not included in the permit however. These are as follows:

60.47b(b)(1) - emission monitoring for sulfur dioxide - Determine compliance with the definition of very low sulfur fuel oil by collecting oil samples in an as-fired condition for each boiler and analyzing them for sulfur according to Method 19 (as specified in 60.42b(j))

60.49b -reporting and recordkeeping

- record and maintain records of daily amounts of each fuel fired and calculate the annual capacity factor of each fuel for each calendar quarter (60.49b(d))

- maintain records of the following information for each operational day of each boiler:
  - calendar date
  - average hourly NOx emission rate measured (lb/MMBtu)
  - the 30-day average NOx emission rate (lb/MMBtu) calculated at the end of each day on a 30-day rolling basis
  - Identification of the steam generating unit operating days when the 30-day average nitrogen oxides emission rates are in excess of the NOx emission standards under 60.44b, with the reasons for such excess emissions as well as a description of corrective actions taken.
  - Identification of the steam generating unit operating days for which pollutant data have not been obtained, including reasons for not obtaining sufficient data and a description of corrective actions taken.
  - Identification of the times when emission data have been excluded from the calculation of average emission rates and the reasons for excluding data.
  - Identification of AF@factor used for calculations, method of determination, and type of fuel combusted.
  - Identification of the times when the pollutant concentration exceeded full span of the continuous monitoring system.
  - Description of any modifications to the continuous monitoring system that could affect the ability of the continuous monitoring system to comply with Performance Specifications 2 or 3.
  - Results of daily CEMS drift tests and quarterly accuracy assessments as required under appendix F, Procedure 1. (60.49b(g)(1-10))
- submit excess emission reports for NOx and opacity for any calendar quarter during which there are excess emissions from the boilers. If there are no excess emissions during the calendar quarter, a report shall be submitted stating that no excess emissions occurred during that quarter. (60.49b(h))
- submit quarterly NOx monitoring reports containing the information required by 60.49b(g) for each boiler (60.49B(i))

In addition, as a result of EPA comment, a condition that generally requires the three boilers to be operated in compliance with NSPS Db will be incorporated into the Title V permit.

1. Each of the two No. 6 fuel oil storage tanks are subject to the lifetime storage tank dimension recordkeeping requirement of NSPS Subpart Kb (40 CFR 60.110b). The only applicable requirement for the two storage tanks from this NSPS is the aforementioned dimension recordkeeping. This recordkeeping requirement was included in the recordkeeping condition of the 03/07/01 NSR permit (Condition #25 above), and it will thus be incorporated into the Title V permit with the rest of this condition as Title V permit Condition #14 of Section 4.A.

b. Generally Applicable Requirements

Certain conditions within existing NSR permits may be applicable to all newly constructed or modified equipment that receive a permit. Below is a listing of these conditions from the 2001 NSR permit:

Condition #29

In order to minimize the duration and frequency of excess emissions due to malfunctions of process equipment or air pollution control equipment, the permittee shall:

- a. Develop a maintenance schedule and maintain records of all scheduled and non-scheduled maintenance. These records shall be maintained on site for a period of five (5) years and shall be made available to DEQ personnel upon request.
- b. Maintain an inventory of spare parts that are needed to minimize the duration of air pollution control equipment breakdowns.  
(9 VAC 5-170-160 of State Regulations)

Condition #30

The permittee shall have available written operating procedures for the related air pollution control equipment. Operators shall be trained in the proper operation of all such equipment and shall be familiar with the written operating procedures. These procedures shall be based on the manufacturer's recommendations, at minimum. The permittee shall maintain records of training provided including names of trainees, date of training and nature of training.

(9 VAC 5-170-160 of State Regulations)

These conditions are being retained in the Title V permit because they are applicable requirements generally applied to all modified and newly constructed equipment permitted through the minor NSR permit program.

- c. State-Only Requirements - In addition to criteria pollutant emission limits of Condition #13, the 2001 permit contains emission limits, in Condition #35, for six substances which are toxic compounds for the purposes of VA DEQ's toxic pollutant regulation for new and modified sources, 9 VAC 5-50-180 (Rule 5-3). As this regulation is not SIP approved, emission limitations based on it are not federally enforceable applicable requirements; they are state-only requirements. In fact, Condition #35 is in the "state-only enforceable" section of the 2001 permit. As such, VA DEQ's current policy for such state-only requirements is to not include them in Title V.
- d. Future Applicable Requirements - N/A
- e. Inapplicable Requirements

Because they were issued a NSR permit and are NSPS Subpart Db applicable, the three B&W boilers are not subject to any Part IV standard.

f. Obsolete Requirements

Certain conditions of the 2001 NSR permit for the source are obsolete, no longer serve any meaningful purpose, and are unnecessary for Title V considerations. Condition 24 contains the notification requirements for construction and testing and has been removed deemed obsolete since the notifications are one-time requirements and have already been preformed. Similarly, the performance test requirements of Conditions 16, 17, 22, and 23 of the 2001 permit have been deemed obsolete for Title V purposes since these were one time requirements that have already been performed. Conditions 3 and 15 of the 2001 permit are also being left out of the Title V permit because they concern the shutdown of the old power plant, which has already been accomplished. As the three

boilers and their stacks have already been constructed, stacktested, and monitored, Condition 9 of the 2001 permit has been met and is now obsolete.

Condition 26 from the 2001 permit is being left out of the Title V permit because the condition defines the causes for modification or revocation of an NSR permit which can be considered extraneous to the Title V permit. The assumption underlying this determination is that if an NSR permit is revoked or modified through unsolicited action by DEQ, the Title V permit will be changed in a separate and independent action from the NSR change. The Title V permit will change to reflect the changes in applicable requirements brought about by the NSR change.

Condition 27 of the 2001 permit is not being included as an applicable requirement in the Title V permit because it is out-dated. The Part 70 regulations define specific inspection and entry requirements consistent with the issuance of a TITLE V permit. These requirements are described in Condition M in the General Permit Condition Section of the Title V permit and are at least as stringent as the NSR requirements. Inclusion of this condition would be redundant and the requirements have been overtaken by the Title V (Part 70) regulations.

Condition 28 of the 2001 permit is not being included as an applicable requirement in the Title V permit because it is included in the Condition B in the General Permit Condition Section of the Title V permit and is included as part of the malfunction reporting requirements for the overall permit. Including this condition as a separate enforceable condition on the permitted equipment in addition to the entire listing of equipment covered by the TITLE V permit creates a situation where conditions are both redundant and confusing.

Condition 31 of the 2001 permit is not being included as an applicable requirement in the Title V permit because the condition, which voids the permit if modification is not commenced within 18 months, is obsolete and environmentally insignificant. These determinations are consistent with the conditions set down in the White Paper dated July 10, 1995 because the modification outlined in both these permits has already been accomplished.

Condition 32 of the 2001 permit is not being included as an applicable requirement in the Title V permit because it is redundant. Condition Q in the General Permit Condition Section of the Title V permit describes the requirements for transfer of ownership relative to the Title V permit. The transfer of ownership requirements for the NSR permit are therefore inappropriate for inclusion in the Title V permit.

In addition the testing requirements of sections 60.45b and 60.46b of NSPS Subpart Db are obsolete since they have already been performed for these three boilers. Similarly the reporting provisions of NSPS Subpart Db outlined in 60.49b(a) and 60.49b(b) are obsolete since they have already been performed for these three boilers. Therefore, none of the provisions of 60.45b, 60.46b, and 60.49(a and b) will be included in the Title V permit.

g. Streamlining of Requirements

Condition #6 of the 2001 permit requires the control of particulate emissions from the three boilers by specifying the use of only clean fuels. Condition 8 of the 2001 permit, approved fuels for the three boilers of natural gas and #6 oil, accomplishes the same goal, but in a more specific fashion, so Condition 8 will serve in the Title V permit (as condition 3 of section 4.A.) in a streamlined fashion for both conditions. Periodic

monitoring for this streamlined condition is outlined in the periodic monitoring section below.

Similarly, the requirements of condition 5 of the 2001 permit, the control of SO<sub>2</sub> emissions by the use of low sulfur oil, are included in a more explicit fashion in Condition 21 of the 2001 permit, so Condition 21 will serve in the Title V permit (as condition 9 of section 4.A.) in a streamlined fashion for both conditions. Periodic monitoring for this streamlined condition is outlined in the periodic monitoring section below.

In addition as mentioned in the applicable requirements section, certain provisions of NSPS Subpart Db are contained in a streamlined fashion in the conditions of the 2001 permit. The provisions of 60.42b applicable to the boilers are included Condition 21 of the 2001 permit, so Condition 21 will serve in the Title V permit (as condition 9 of section 4.A.) in a streamlined fashion for 60.42b. Periodic monitoring for this streamlined condition is outlined in the periodic monitoring section below.

The provisions of 60.43b applicable to the boilers (20% opacity standard) are less stringent than the 10% opacity VA state BACT standard in Condition 14 of the 2001 permit, so Condition 14 will serve in the Title V permit (as condition 8 of section 4.A.) in a streamlined fashion for 60.43b. Periodic monitoring for this streamlined condition is outlined in the periodic monitoring section below.

The provisions of 60.44b applicable to the boilers (0.2 lb/MMBtu for natural gas; 0.4 lb/MMBtu for residual oil) are less stringent than the VA state BACT NO<sub>x</sub> standard (0.1 lb/MMBtu natural gas; 0.4 lb/MMBtu) in Condition 12 of the 2001 permit, so Condition 12 will serve in the Title V permit (as condition 6 of section 4.A.) in a streamlined fashion for 60.44b. Periodic monitoring for this streamlined condition is outlined in the periodic monitoring section below.

The provisions of 60.48b applicable to the boilers (NO<sub>x</sub> and opacity CEMS) are included in Conditions 16, 18, 19, and 20 of the 2001 permit, so these conditions will serve in the Title V permit (as conditions 10, 11, 15, and 12 of section 4.A.) in a streamlined fashion for 60.48b.

## **5. Standard Terms and Conditions**

### **a. Facility Wide Conditions and Permit Terms**

New Source Standard for visible emissions - The new source opacity limit (20% opacity) is applied to the equipment listed in Section 7 (insignificant activities) because they were constructed after 1972 and therefore meet the definition of new source, even though the Section 7 equipment are insignificant emission units. The new source opacity standard is not applied to the three B&W boilers because they have a 10% opacity limit from the 2001 NSR permit.

### **b. General Permit Conditions**

- A. Federal Enforceability
- B. Permit Expiration
- C. Recordkeeping and Reporting
- D. Annual Compliance Certification
- E. Permit Deviation Reporting
- F. Failure/Malfunction Reporting
- G. Severability
- H. Duty to Comply
- I. Need to Halt Reduce Activity Not a Defense



- J. Permit Action for Cause
- K. Property Rights
- L. Duty to Submit Information
- M. Duty to Pay Permit Fees
- N. Fugitive Dust Emission Standards
- O. Startup, Shutdown, and Malfunction
- P. Alternative Operating Scenarios
- Q. Inspection and Entry Requirements
- R. Reopening for Cause
- S. Permit Availability
- T. Transfer of Permits
- U. Malfunction as an Affirmative Defense
- V. Permit Revocation or Termination For Cause
- W. Duty to Supplement or Correct Application
- X. Stratospheric Ozone Protection
- Y. Accidental Release Prevention
- Z. Changes to Permits for Emission Trading
- AA. Emissions Trading

## **6. Periodic Monitoring**

The EPA periodic monitoring guidance, dated September 18, 1998, indicates on page 4 that periodic monitoring is required for each emission point at a source, subject to Title V of the Act, that is subject to an applicable requirement. The only units requiring periodic monitoring at this source are the three B&W boilers. The applicable periodic monitoring is defined as follows:

Conditions #4 and #7 of the 2001 permit:

Monitoring for these requirements shall be met by keeping the maintenance and operating procedure training record required by Conditions from Conditions #29 and #30 of the 2001 permit. The source shall certify compliance semi-annually as per 9 VAC 5-80-110 F.2.a.

Conditions #8:

Monitoring for this requirement shall be met by keeping the daily fuel usage records required by 60.49b. The source shall certify compliance semi-annually as per 9 VAC 5-80-110 F.2.a.

Conditions #10 - 1706 million cubic feet/yr natural gas - for all three boilers combined

Monitoring for this requirement shall be met by keeping the annual fuel usage data on a 12 month rolling basis as required by Condition #25 of the 2001 permit. The source shall certify compliance semi-annually as per 9 VAC 5-80-110 F.2.a.

Conditions #10 - 0.30 million cubic feet/hr natural gas - for all three boilers combined

Monitoring for this requirement shall be met by keeping daily records of hours of operation of each boiler (as required by Condition 25 of the 2001 permit) and daily records of the amount of each fuel burned in each boiler (as required by 60.49b). The total hourly combustion rate of each fuel fired in any of the three boilers shall then be calculated and recorded on a daily basis by dividing the total amount of each fuel fired by the three boilers by the total hours of operation of the three boilers while firing each fuel. The source shall certify compliance semi-annually as per 9 VAC 5-80-110 F.2.a.

Conditions #11 - 1,830,000 gallons/yr #6 oil - for all three boilers combined

Monitoring for this requirement shall be met by keeping the annual fuel usage data on a 12 month rolling basis as required by Condition #25 of the 2001 permit. The source shall certify compliance semi-annually as per 9 VAC 5-80-110 F.2.a.

Conditions #11 - 2000 gallons/hr #6 oil - for all three boilers combined

Monitoring for this requirement shall be met by keeping daily records of hours of operation of each boiler (as required by Condition 25 of the 2001 permit) and daily records of the amount of each fuel burned in each boiler (as required by 60.49b). The total hourly combustion rate of each fuel fired in any of the three boilers shall then be calculated and recorded on a daily basis by dividing the total amount of each fuel fired by the three boilers by the total hours of operation of the three boilers while firing each fuel. The source shall certify compliance semi-annually as per 9 VAC 5-80-110 F.2.a.

Condition #12 - hourly criteria pollutant emission limits for each boiler for each fuel

The hourly emission limits established for TSP, PM10, CO, SO2, and VOC for natural gas combustion and TSP, PM10, CO, and VOC for residual oil combustion are based on the capacity of the three boilers. Similarly, the hourly emission limit established for SO2 from residual oil combustion is based on the capacity of the three boilers and the sulfur content of the residual oil. Therefore, if the three boilers are operated at capacity, or below, and the residual oil sulfur content limit is met (see periodic monitoring for Condition 21 below), there should not be a violation of the hourly emission rates listed above. Calculations have been included in Attachment 1 to demonstrate how the limits were obtained. The hourly emission limits established for NOx from the combustion of both fuels will be tracked via CEM data as specified by the monitoring, reporting, and recordkeeping conditions (16, 18, 19, 20, 25) of the 2001 permit.

Condition #13 - plant-wide hourly emission limits from the operation of the three boilers

The plant-wide hourly emission limits established for TSP, PM10, CO, and VOC are based on the hourly fuel throughput limits contained in Conditions 10 and 11 of the 2001 permit. Similarly, the hourly emission limit established for SO2 is based on the hourly throughput limits contained in Conditions 10 and 11 of the 2001 permit and the sulfur content of the residual oil. Therefore, if the hourly throughputs limits of Conditions 10 and 11 are adhered to (see periodic monitoring for Conditions 10 and 11 above) and the residual oil sulfur content limit is met (see periodic monitoring for Condition 21 below), there should not be a violation of the hourly emission rates listed above. Calculations have been included in Attachment 2 to demonstrate how the limits were obtained. The plant-wide hourly emission limit established for NOx will be tracked via CEM data as specified by the monitoring, reporting, and recordkeeping conditions (16, 18, 19, 20, 25) of the 2001 permit.

Condition #13 - plant-wide annual emission limits from the operation of the three boilers. The annual emission limits established for TSP, PM10, SO2, CO, and VOC are based on the annual fuel throughput limits contained in Conditions 11 and 12 of the 2001 permit and, for SO2, the residual oil sulfur content limit contained in Condition 21 of the 2001 permit. Therefore, if the annual throughput limits of Condition 10 and 11 are adhered to (see periodic monitoring for Conditions 10 and 11 above) and the residual oil sulfur content limit is met (see periodic monitoring for Condition 21 below), there should not be a violation of the annual emission rates listed above. Calculations have been included in Attachment 3 to demonstrate that if VCU combusts their maximum permitted fuel amounts or less, then the emission limits will not be violated. The plant-wide annual emission limit established for NOx will be tracked via CEM data as specified by the monitoring, reporting, and recordkeeping conditions (16, 18, 19, 20, 25) of the 2001 permit.

Condition #14 - opacity limit for each boiler

Opacity CEM data as provided in the monitoring, recordkeeping, and reporting conditions (16, 18, 19, 20, and 25) of the 2001 permit will be used to monitor compliance with this opacity limit.

Condition #16 - NOx and opacity monitors to be installed, maintained, and calibrated

The CEM recordkeeping and reporting provisions of Conditions 18, 19, and 25 will be used to ensure compliance with this requirement.

Condition #20 - 90% data capture rate for opacity and NOx monitors  
The CEM recordkeeping and reporting provisions of Conditions 18, 19, and 25 will be used to ensure compliance with this requirement.

Condition #21 - 0.5% sulfur content in residual oil combusted by the three boilers  
Monitor in accordance with 60.47b(b)(1) and Condition 25 of the 2001 permit.

7. **Insignificant Activities -**

- two 750 KW diesel-fired emergency generators (Reference No. GNE-001, GNE-002); insignificant by 9 VAC 5-80-720 C

8. **Public Participation** - The draft permit went to public notice in the Richmond Times-Dispatch on February 12, 2001. This public notice period expired on March 14, 2001. The only comments received were from Mr. Dave Campbell of EPA Region III. Mr. Campbell's comments are addressed in the attached letter.

9. **Confidentiality** - N/A

Attachment 1 - Title V Statement of Basis  
Emission Calculation Demonstration for Periodic Monitoring  
Condition #12 of 2001 permit  
Hourly criteria pollutant emissions on a per boiler basis

Three Babcock and Wilcox 150 MMBtu/hr #6 oil/natural gas-fired boilers

- maximum rated heat input capacity of  $150 \times 10^6$  Btu/hr each
- natural gas: 1000 Btu/cf, 0.15 mmcf/hr each (maximum per unit capacity); 0.30 mmcf/hr and 1706 mmcf/yr totals for all three boilers combined (permitted levels from Condition #10 in 2001 NSR permit)
- #6 oil: 150,000 Btu/gal, 0.5%S (permitted level from Condition #21 in 2001 NSR permit); 1.0 mgal/hr each (maximum per unit capacity); 2.0 mgal/hr and 1830 mgal/yr totals for all three boilers combined
- Low-NOX burners (including FGR); No other control equipment

Emission Factors

	(natural gas; lb/mmcf)		(#6 oil; lb/mgal)		
TSP	5.0	AP-42	7.82	AP-42	
PM10	5.0	AP-42	5.49	AP-42	
SO2	0.6	AP-42	157S	AP-42	* (= 78.5 at 0.5%S fuel)
CO	96.0	M.G.**	15.0	M.G.**	
VOC	13.0	M.G.**	2.0	M.G.**	

\*\*M.G. - Manufacturer's Guarantee

**Natural Gas Calculations**

TSP	- 0.15 mmcf/hr * 5.0 lb/mmcf	= 0.8 lb/hr
PM10	- 0.15 mmcf/hr * 5.0 lb/mmcf	= 0.8 lb/hr
SO2	- 0.15 mmcf/hr * 0.6 lb/mmcf	= 0.09 lb/hr
CO	- 0.15 mmcf/hr * 96.0 lb/mmcf	= 14.4 lb/hr
VOC	- 0.15 mmcf/hr * 13.0 lb/mmcf	= 2.0 lb/hr

**#6 oil Calculations**

TSP	- 1.0 mgal/hr * 7.82 lb/mgal	= 7.8 lb/hr
PM10	- 1.0 mgal/hr * 5.49 lb/mgal	= 5.5 lb/hr
SO2	- 1.0 mgal/hr * 78.5 lb/mgal	= 78.5 lb/hr
CO	- 1.0 mgal/hr * 15.0 lb/mgal	= 15.0 lb/hr
VOC	- 1.0 mgal/hr * 2.0 lb/mgal	= 2.0 lb/hr

Attachment 2 - Title V Statement of Basis  
Emission Calculation Demonstration for Periodic Monitoring  
Condition #13 of 2001 permit  
Hourly criteria pollutant emissions on a plant-wide basis

Three Babcock and Wilcox 150 MMBtu/hr #6 oil/natural gas-fired boilers

- maximum rated heat input capacity of  $150 \times 10^6$  Btu/hr each
- natural gas: 1000 Btu/cf, 0.15 mmcf/hr each (maximum per unit capacity); 0.30 mmcf/hr and 1706 mmcf/yr totals for all three boilers combined (permitted levels from Condition #10 in 2001 NSR permit)
- #6 oil: 150,000 Btu/gal, 0.5%S (permitted level from Condition #21 in 2001 NSR permit); 1.0 mgal/hr each (maximum per unit capacity); 2.0 mgal/hr and 1830 mgal/yr totals for all three boilers combined
- Low-NOX burners (including FGR); No other control equipment

Emission Factors

	(natural gas; lb/mmcf)		(#6 oil; lb/mgal)		
TSP	5.0	AP-42	7.82	AP-42	
PM10	5.0	AP-42	5.49	AP-42	
SO2	0.6	AP-42	157S	AP-42	* (= 78.5 at 0.5%S fuel)
CO	96.0	M.G.**	15.0	M.G.**	
VOC	13.0	M.G.**	2.0	M.G.**	

\*\*M.G. - Manufacturer's Guarantee

**Natural Gas Calculations**

TSP	- 0.30 mmcf/hr * 5.0 lb/mmcf	= 1.5 lb/hr
PM10	- 0.30 mmcf/hr * 5.0 lb/mmcf	= 1.5 lb/hr
SO2	- 0.30 mmcf/hr * 0.6 lb/mmcf	= 0.18 lb/hr
CO	- 0.30 mmcf/hr * 96.0 lb/mmcf	= 28.8 lb/hr
VOC	- 0.30 mmcf/hr * 13.0 lb/mmcf	= 3.9 lb/hr

**#6 oil Calculations**

TSP	- 2.0 mgal/hr * 7.82 lb/mgal	= 15.6 lb/hr
PM10	- 2.0 mgal/hr * 5.49 lb/mgal	= 11.0 lb/hr
SO2	- 2.0 mgal/hr * 78.5 lb/mgal	= 157.0 lb/hr
CO	- 2.0 mgal/hr * 15.0 lb/mgal	= 30.0 lb/hr
VOC	- 2.0 mgal/hr * 2.0 lb/mgal	= 4.0 lb/hr

\*\*As they were the greater of the two emission sets, the #6 oil calculations were used in the 2001 permit as the plant-wide hourly emissions.

Attachment 3 - Title V Statement of Basis  
Emission Calculation Demonstration for Periodic Monitoring  
Condition #13 of 2001 permit  
Annual criteria pollutant emissions on a plant-wide basis

Three Babcock and Wilcox 150 MMBtu/hr #6 oil/natural gas-fired boilers

- maximum rated heat input capacity of  $150 \times 10^6$  Btu/hr each
- natural gas: 1000 Btu/cf, 0.15 mmcf/hr each (maximum per unit capacity); 0.30 mmcf/hr and 1706 mmcf/yr totals for all three boilers combined (permitted levels from Condition #10 in 2001 NSR permit)
- #6 oil: 150,000 Btu/gal, 0.5%S (permitted level from Condition #21 in 2001 NSR permit); 1.0 mgal/hr each (maximum per unit capacity); 2.0 mgal/hr and 1830 mgal/yr totals for all three boilers combined
- Low-NOX burners (including FGR); No other control equipment

Emission Factors

	(natural gas; lb/mmcf)		(#6 oil; lb/mgal)		
TSP	5.0	AP-42	7.82	AP-42	
PM10	5.0	AP-42	5.49	AP-42	
SO2	0.6	AP-42	157S	AP-42	* (= 78.5 at 0.5%S fuel)
CO	96.0	M.G.**	15.0	M.G.**	
VOC	13.0	M.G.**	2.0	M.G.**	

\*\*M.G. - Manufacturer's Guarantee

**Natural Gas Calculations**

TSP	- 1706 mmcf/yr * 5 lb/mgal / 2000 lb/ton	= 4.27 ton/yr
PM10	- 1706 mmcf/yr * 5 lb/mgal / 2000 lb/ton	= 4.27 ton/yr
SO2	- 1706 mmcf/yr * 0.6 lb/mgal / 2000 lb/ton	= 0.51 ton/yr
CO	- 1706 mmcf/yr * 96.0 lb/mgal / 2000 lb/ton	= 81.89 ton/yr
VOC	- 1706 mmcf/yr * 13.0 lb/mgal / 2000 lb/ton	= 11.09 ton/yr

**#6 oil Calculations**

TSP	- 1830 mgal/yr * 7.82 lb/mgal / 2000 lb/ton	= 7.15 ton/yr
PM10	- 1830 mgal/yr * 5.49 lb/mgal / 2000 lb/ton	= 5.02 ton/yr
SO2	- 1830 mgal/yr * 78.5 lb/mgal / 2000 lb/ton	= 71.83 ton/yr
CO	- 1830 mgal/yr * 15.0 lb/mgal / 2000 lb/ton	= 13.73 ton/yr
VOC	- 1830 mgal/yr * 2.0 lb/mgal / 2000 lb/ton	= 1.83 ton/yr

**Permitted Annual Plant-Wide Emissions (Sum of #6 oil and gas) Calculations**

TSP	- 7.15 + 4.27	= 11.4 ton/yr
PM10	- 5.02 + 4.27	= 9.3 ton/yr
SO2	- 71.83 + 0.51	= 72.3 ton/yr
CO	- 13.73 + 81.89	= 95.6 ton/yr
VOC	- 1.83 + 11.09	= 12.9 ton/yr



**COMMONWEALTH OF VIRGINIA**  
**DEPARTMENT OF ENVIRONMENTAL QUALITY**  
*Piedmont Regional Office*

**MEMO**

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**TO:** Statement of Basis  
**FROM:** Rebekah Remick, Environmental Engineer  
**DATE:** October 13, 2004  
**SUBJECT:** Title V Amendment

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Company Name: VCU Steam Plant MCV Campus  
1020 Oliver Hill Way  
P.O. Box 980166  
Richmond, VA 23298

The Department received a letter and permit application from Mr. Jeffery R. Zehner of Aegis Environmental, Inc. (on behalf of Virginia Commonwealth University) on June 21, 2004, stating that he had a significant modification to VCU's Title V. The application was required due to the Prevention of Significant Deterioration (PSD) permit that was issued to VCU on March 31, 2003. Therefore, the PSD permit had to be included into the Title V. Taking all of the necessary conditions from the PSD permit and adding them into the Title V in the appropriate sections did this. No new limits or calculations were added/changed during this process. Some conditions were modified to add in #2 fuel that was now being used. The following conditions of the Title V permit were modified in a significant fashion:

<u>Condition Number</u>	<u>Condition Type</u>
Section II. B-1	<ul style="list-style-type: none"><li>• Emission Unit Description – Added #2 fuel oil</li></ul>
Section III. A-1	<ul style="list-style-type: none"><li>• Size/Rated Capacity – Changed TKE-001, 002 to 243,6000 gallons</li></ul>
Section III. A-2	<ul style="list-style-type: none"><li>• NOx emission controls</li></ul>
Section III. A-3	<ul style="list-style-type: none"><li>• CO and VOC emission controls</li></ul>
Section III. A-4	<ul style="list-style-type: none"><li>• Sulfur Dioxide emission controls</li></ul>
Section III. A-5	<ul style="list-style-type: none"><li>• Approved fuels</li></ul>
Section III. A-6	<ul style="list-style-type: none"><li>• Fuel certification details</li></ul>
Section III. A-7	<ul style="list-style-type: none"><li>• Natural gas fuel throughput limit for 3 boilers</li></ul>
Section III. A-8	<ul style="list-style-type: none"><li>• #2/#6 fuel oil throughput limit for 3 boilers</li></ul>
Section III. A-9	<ul style="list-style-type: none"><li>• BTU limits on 3 boilers (NOx emissions)</li></ul>
Section III. A-10	<ul style="list-style-type: none"><li>• Emission limits on boilers – per boiler</li></ul>
Section III. A-11	<ul style="list-style-type: none"><li>• Emission limits on boilers - combined</li></ul>
Section III. A-12	<ul style="list-style-type: none"><li>• Visible emissions limits</li></ul>
Section III. B-1	<ul style="list-style-type: none"><li>• Sulfur content limit of any oil (#2 and #6)</li></ul>
	<ul style="list-style-type: none"><li>• Continuous emission monitors for concentrations of nitrogen oxides</li></ul>

Section III. B-2	• Continuous emission monitors for concentrations of nitrogen oxides
Section III. B-3	• Nitrogen oxides and opacity monitoring
Section III. B-4	• Kinds of monitoring
Section III. B-5	• Maintaining records
Section III. B-6	• FGR system controls
Section III. C-1	• Reporting fuel quality reports
Section III. C-2	• Quarterly reports

The citations of all the conditions were updated to reflect the 3/31/2003 PSD permit.

When VCU was given the draft permit to look over, they commented on Section V. J-2, f, g. They commented that recently issued Title V permits had different boilerplate language for the General Conditions and "f" and "g" were not included. They are as stated below:

*Such changes that may require a permit modification and/or revisions include, but are not limited to, the following:*

1. *Addition of an emissions unit which qualifies as insignificant by emissions rate (9 VAC 5-80-720 B) or by size or production rate (9 VAC 5-80-720 C);*
2. *Any change in insignificant activities, as defined by 9 VAC 5-80-90 D.1.a(1) and 9 VAC 5-80-720 B and 9 VAC 5-80-720 C.*

Since they were concerning insignificant emissions, it was decided to take these out of the Title V permit, as VCU requested.

In addition, a Compliance Assurance Monitoring (CAM) Plan was included in the application for the facility according to 40 CFR 65.4(a)(2). This was due to the fact that the three (3) boilers have a flue gas recirculation (FGR) system as a means to control NO<sub>x</sub> emissions and the boilers' uncontrolled NO<sub>x</sub> emissions are above major source thresholds. To incorporate this into the Title V permit, the following statement was inserted right after Section III. B, *Periodic Monitoring and Recording*:

"The following conditions, 1-6, are included in this Title V permit to implement the requirements of the CAM regulations (40 CFR 64)."

Condition 6 in this section was also added after having a phone conversation with Mr. Zehner and Mr. Wood on July 19, 2004. They made it clear saying that there is going to be some control on the FGR System.

Therefore, the CAM Plan is now part of the Title V permit.